Implementing Land and Property Taxes and Creating a Fiscal Cadastre in the Republic of Armenia

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By

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ABSTRACT

This report further analyzes the work that must be done to introduce broad-based land and building taxes in the Republic of Armenia. It proposes a three-phase implementation effort, beginning with a system based on taxpayer (person) registers. In the second phase, a rudimentary fiscal cadastre (or parcel register) would be created. The third phase would begin when urban fiscal cadastral records were based on official legal cadastral records. (Also see Richard R. Almy, "Cadastral Re - cords, Property Taxation, and the Privatization of Property in the Republic of Armenia.")

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EXECUTIVE SUMMARY

This is a report of a short-term technical assistance mission to Armenia by Richard Almy in November 1993. The purpose of the mission was to assist Armenia develop legal and fiscal cadastres and to intro duce recurrent taxes on land, buildings, and other property. It followed an earlier mission (see Richard R. Almy, "Cadas tral Records, Proper ty Taxa tion, and the Privat - ization of Proper ty in the Republic of Armenia," October 1993). Almy was joined by Lynn C. Holstein (see Lynn Hol stein, "Aspects of the Legal Cadas tre in Arme nia," December 1993.)

A. ESTABLISHMENT OF A LEGAL FRAMEWORK FOR PROPERTY TAXATION

Armenia has made considerable prog ress in draft ing two property tax laws: a law about property tax and a law about land tax. (Armenia's definition of "property" includes buildings and movable property but excludes land.) The English versions of the draft laws suggest a complex, loosely coordinated, but not unworkable property tax system. Additional efforts to harmonize them would be desirable. The policy objectives of some of the tax differentials and exemptions in the draft laws are not always clear. Analyses of the fiscal and economic effects of these differentials would be desir able. The goals of the analy ses would be to ensure that the land and proper ty taxes reinforce Armenia's broader policy objectives and meet its fiscal objec - tives.

B. MARKET MONITORING

The Armenian Urban Research Institute (AURI) has been moni - toring immov able property market activity in the City of Yerevan. The researchers are collecting informa tion on listings, which they regard as a measure of supply. They are collecting informa - tion on transaction prices, which they term "the market price of demand." Finally, they are collecting informa tion on transac - tions regis tered in the Yerevan inventory office. Most price data is obtained by members of the monitor ing team posing as buyers, negoti ating a deal, and then backing out of it. They regard the prices agreed to as reasonable surrogates for actual market prices, which generally are not revealed by the parties involved.

The researchers plan to track sales from initial agreement between the buyer and seller through registration of the change in ownership. This will enable them to obtain information on the degree to which prices are under stated in registration. They plan to plot sales on maps, which will enable additional spatial

analyses. The data base software being used will permit additional computer-assisted analyses of the data. As an example, I did some exploratory valuation modeling. The model described in annex 5 suggests (a) that the housing market in Yerevan is behaving rationally, (b) that AURI's delineation of land value zones was successful, and (c) that modern, computer-assisted mass valuation methods could be used in Armenia.

In summary, the AURI market monitoring program appears sound, although some improvements could be made. As general recommendations, data quality should be stressed over data quantity and the research should concentrate on sales rather than listings. Each sale should be identified by its address (or cadastral number). Properties with unusual physical characteristics or prices would be checked in the field. I also would recommend a test program of contacting the seller, buyer, or both after registration to confirm sales information and to evaluate whether a sale is an "arm's-length, open-market" transaction that is representative of the housing and land market in Yerevan. I recommend that the feasibility of doing similar research outside Yerevan be explored.

One of the benefits of the research is that the researchers will gain valuable experience. More important, the research can provide the basis for simple mass valuation models for estimating the value of residential immovable property, which the Tax Inspectorate could use in implementing the property taxes.

One question that should be asked is whether early sales in a market truly reflect the supply and demand for housing in Yerevan or whether they represent a market niche. If the AURI's exchange rate of 2,500 rubles to the dollar is reasonably accurate, there is some evidence that the dollar sales reflect one market and the ruble sales another. The median price of dollar sales was $8,000, which is about 160 times the minimum annual salary and about 30 times a professional salary. In contrast, the median ruble price converted to dollars was $1,900, which is about 40 times the minimum salary and six times a professional salary. It seems unlikely that ordinary families could purchase housing at dollar prices. In other words, the observed prices may not represent typical housing values. Annex 5 illustrates the consequences of using an inappropriate valuation model.

C. PROPERTY TAX SYSTEM RECOMMENDATIONS

Armenia's property tax system must be able to identify taxable subjects (taxpayers) and taxable objects and link them. Objects must be valued and assessed correctly. Tax assessments

must be collected. If any of these is done poorly, tax equity will suffer. Revenues also may suffer.

Economic realities dictate that Armenia install a property tax system quickly, with available resources, and with available data. Fiscal needs dictate that the property tax system be installed before a comprehensive fiscal cadastre can be completed. Initially, the Tax Inspectorate should concentrate on the most valuable objects of taxation and the subjects whose property is sufficiently valuable to generate tax revenue in excess of administrative costs. Mass valuation models should be simple--requiring only data that are readily available. Public information programs, billing, and enforcement should be vigorous so that taxpayers realize that the new taxes are "real."

1. Taxpayer Registration System

Property tax systems can be organized in two broad ways: (1) by registering property as declared by owners and (2) by building a fiscal cadastre. Taking advantage of its experience and existing person identification systems and recognizing shortcomings in records of taxable objects, the Tax Inspectorate plans to build a register of taxable subjects (both physical and legal persons) that contains information about the assessable property they hold. This is an appropriate initial choice, as existing records of taxable objects are incomplete and dispersed. In particular, there are no records of urban land parcels. However, Armenia should expediously develop a land parcel-based fiscal cadastre for the reasons outlined below.

The Tax Inspectorate envisages obtaining information about property owners and users and their property holdings from available sources, including owners and users themselves, inventory offices, Giprozem, and other offices. The Inspectorate would assemble the information in its computer system, value property, calculate taxes, and send tax statements to taxpayers who are physical persons. Records would be organized by personal identification number, although provisions should be made for address and cadastral number cross references.

The draft law on property tax law provides that separate tax bills be sent to part owners of a building. Presumably the intent of this is allow separate tax bills for privately owned apartments. If the provision is applied to part owners of apartments, as some fear, it will substantially complicate administration of the tax and possibly create a large "loop hole" which many will use to avoid paying property taxes.

To implement the proposed tax system, the Tax Inspectorate will need to design tax returns for both physical and legal persons. It may not be able to rely on receiving needed information from other agencies in a timely fashion. It would be unwise to allow a subject to avoid the obligation of paying taxes merely because of a failure or lack of capacity on the part of some government agency.

A system for distributing blank returns will need to be devised. Procedures for receiving and processing returns will need to be developed. These include recording the receipt of returns, reviewing them for completeness and accuracy, and making necessary revisions, and calculating assessments and taxes due. Returns should be matched manually or by computer with lists of enterprises, privatized apartments, peasant farms, and the like. Mismatches would need to be investigated.

Problems can be anticipated with incomplete returns and errors. Variations in the spelling of names and errors in inscribing identification numbers can be problematic in any system. If possible, bar coding technology should be used to speed processing of returns and tax payments.

Although I support a taxpayer register system initially, international experience has shown that such systems have serious shortcomings. Some taxpayers will fail to declare any property. More will under-report or under-value their property. Opportunities for favoritism and corruption will grow. In short, tax equity and revenue yield will suffer.

2. Fiscal Cadastre

Only by creating a fiscal cadastre, which organizes land and building records geographically, can the tax administration ensure that all assessable objects are discovered and correctly described. Having information on spatial characteristics also facilitates valuation, particularly of land. The recommended fiscal cadastre would consist of (1) a set of large-scale maps depicting parcel boundaries; (2) a cadastral numbering system, by which each parcel would be assigned a unique number; (3) records describing the land parcels, any buildings situated on those parcels, and any separately assessable parts of buildings; and (4) records of the persons responsible for paying property taxes. (An important fifth component in a value-based property tax is a separate sales file.)

As noted, all the information needed to build a fiscal cadastre does not exist in Armenia. As urban land parcels have

not been delineated, there are no cadas tral maps, and there has been no need for cadastral numbers. Build ings are not linked with specif ic parcels, and official records may not contain informa tion on all buildings.

Several strategies could be used to convert from a person-based property tax system to a cadastre-based system. Legal and fiscal cadastres could be (1) completely indepen dent, (2) linked, or (3) fully integrated. Independence reduces the need for institutional coordination, but results in duplica tions of effort and redundant, ambiguous data. Full integration theoretically is most appealing but seldom is practi cal administratively and financially. Conse quently, linked legal and fiscal cadastres generally are recom mended. The common elements would be the cadastral maps and the cadastral numbering system. As the legal cadastre is compiled, data would flow from it to the fiscal cadastre to refine the data in the latter.

By neces sity, an Armenian fiscal cadastre initially would be rudimen tary and incomplete. Happily, the Insti tute of Cartogra - phy and Geodesy has produced base maps at scales suitable for the cadastre. The Tax Inspectorate could provisionally delineate parcel boundaries on copies of these maps with sufficient accura - cy for taxation (the boundaries would be adjusted as parcels are regis tered in the legal cadastre). As a cadastral number ing system common to the legal and fiscal cadastres would reduce ambiguity, an early task should be to adopt a standard cadas tral numbering system. The form and content of associated records also would need to be decided.

In summary, the general goal should be to design a function - al, affordable fiscal cadastre, even though it may not reflect the state of the art technologically. A fiscal cadastre is a tool to be used, which implies having the means and willing ness to maintain it. Of course, the eventual creation of digital maps and a geographic information system should be kept in mind.

3. Valuation Systems and Procedures

The introduction of the proposed taxes on land and property will require the development of a valuation system. Initially, the system will have to compensate for (a) the fact that property markets are in an early stage of develop ment, (b) a corre spond ing short age of market data, and (c) a shortage of experi enced valuers. Moreover, the resources that can be allocated to proper ty tax administra tion are limited. However, the design of the valuation system should not be unduly constrained by current conditions, as they can be expected to improve.

Valuation is both a science and an art. It is well described in treatises. Valuers consider three main types of evidence: sales prices, incomes generated from rent, and construction costs. Valuation activities follow a standard process with the following main steps: (1) define the valuation problem; (2) make a preliminary analysis, plan how to solve the problem, and select and collect the necessary data; (3) determine the most economic legal use; (4) (usually) estimate land value; (5) estimate total property value; (6) reconcile value indicators and reach a conclusion as to value; and (7) report the conclusion. These activities are present in the mass valuation systems, although the work must be highly systematized to achieve necessary economies. The valuation problem is defined in legislation. Most of the necessary data reside in the fiscal cadastre. Valuation is accomplished through the development and application of mathematical valuation models. Valuers employ quality assurance procedures to ensure data accuracy, evaluate the valuation models, and review value estimates. Taxation requires that a value estimate be officially adopted for each property, and the estimate (the assessment) be communicated to the taxpayer via an assessment notice or tax bill.

As the description of the valuation process suggests, a number of preliminary analyses must precede the development of value estimates. As the most time-consuming and expensive aspect of a mass valuation program is collecting and processing cadastral data, an important preliminary analysis process is to decide which data are needed. Cadastral records should contain the information needed by the valuation model or models that will be used, as well as the information needed for classification. The records should contain the location, site, and improvement characteristics that affect the attractiveness of a property in the marketplace. Good valuation practice requires a decision as to the most economic legal use of each property. In mass valuation, the current use generally is assumed to be the highest and best use. Information on current use also is necessary to assign land and buildings to their proper tax class.

Monitoring sales is crucially important--even when available data may not be trustworthy. Ideally, information on every sale would be collected, analyzed, and, if necessary, verified. The Tax Inspectorate should maintain a separate sales data file containing a record of each sale. The record should contain information about the sale price and terms, a description of the property as it was when it was sold, and an analyst's opinion as to the usefulness of the sale.

Sales should be reviewed to determine which ones represent "open-market, arm's-length" sales. Only those sales provide convincing evidence of market value. Theoretically, adjustments to a nominal sale price are warranted in a number of circumstances to reflect better the true price that was paid for immovable property. If movable property was included in the sale, the value of that property should be deducted from the total sale price. If the seller lent money to the buyer to complete the purchase, and if the rate of interest charged was different from the market rate of interest, the sale price should be adjusted for the present value of the difference. Such adjustments are more likely to be required for sales of business immovable property. Finally, it may be necessary to adjust sales prices for differences between the dates of sale and the date of valuation. This occurs when price levels are changing significantly, such as when inflation is high.

An important preliminary analysis is to identify submarkets and assign each property to the submarket to which it belongs. Examples of submarkets include those for vacant land and housing. It also is necessary to analyze location effects. Location analyses should consider market area, neighborhood, and site.

Construction cost trends should be monitored. Rental property income and expense data should be collected, screened, and analyzed. Owners or managers of income property should be required to file a confidential income and expense return.

Pilot studies of valuation methods should be made before firmly committing to using them. They would enable valuers to master the methods and gain a first-hand appreciation of their usefulness in Armenia. In addition, they would provide a basis for estimating shifts in tax burdens associated with any changes in valuation methods.

It will be necessary to decide which valuation approaches will be emphasized in the valuation system. Primary valuation options include: (a) market models, (b) income models, and (c) cost models. Valuers prefer market models when sufficient open-market, arm's-length sales are available. Income models should be considered in the valuation of rented properties. Cost models provide a back-up method for valuing buildings when sufficient sales and income data are not available. When the necessary market data are not available, the opinions of panels of experts and point differentiation techniques can be substituted.

Simple models should be used i n the beginning. When the data permit, models of more than one type should be developed, as multiple value estimates provide a consis tency check.

4. Tax Collection and Enforcement

Effective tax collection and enforcement are no less impor - tant than complete discovery and accurate valuation of taxable objects. Property taxation without strict enforcement of tax obligations is not truly "taxa tion" but is a system for accepting contributions. The five main steps of an effective tax collec - tion and enforcement program are: (1) assessment of tax liabil - ities; (2) notification of tax liabilities; (3) persuading taxpayers to pay; (4) receipt and proper recording of the date and amount of tax payments; and (5) enforcement of delinquent tax liabilities. A guiding principle is to make tax payment conve - nient. Possible payment points include tax offices, banks, post offices, and mortgage holders.

The proposed person-based tax register system will require that enforcement actions to collect delinquent taxes be taken against the person, not the property. The administra tive costs of enforcement against persons generally are higher than the costs of attaching a tax lien to a property.

5. Quality Assurance

Public acceptance of the proposed taxes on land and property will depend on effective performance by the staff of the property tax administration. Achieving an acceptable level of performance will require (a) the establishment and documentation of standards of performance, (b) a well-organized and skilled staff, (c) ongoing evaluation of performance, and (d) effective programs to correct problems. Public acceptance also will depend on a perception that the tax is fair. A perception of fairness is reinforced when data are accurate, valuations appear accurate and uniform, collection rates are high, and taxpay ers are treated without prejudice or favoritism. An organizational culture of public service and excellence helps ensure quality work.

6. Appeals

The accuracy and equity of tax assessments w ill depend on well-informed taxpayers, who are given opportunities to "audit" the work of the tax administration and to appeal inaccurate or unfair assessments. Consequently, Armenia should begin to design an appeal procedure. Elements of the procedure will include (a) establishment of rights of appeal (and related legal matters),

(b) creation of appeal bodies, (c) notice of assessment, and (d) procedure for making appeals. Initially, rights of appeal might be limited to such things as corrections of measurements, classification, and eligibility for an exemption. Later, when valuation models are sufficiently sophisticated as to allow a unique valuation of every property, valuations also should be subject to challenge.

D. ORGANIZATION

Successful introduction of land and property taxes in Armenia will require a strong commitment by the Government and the Parliament and an appropriate institutional structure. The Government's and Parliament's understanding of the benefits of property tax and cadastral system development will be essential to securing sufficient initial funding and in resolving any differences between affected institutions.

Organizational relationships between the Tax Inspectorate Office and the agencies responsible for registration of ownership and use rights (Giprozem and the inventory offices) will need to be resolved. Relationships with other agencies, such as AURI and the Institute of Cartography and Geodesy also need to be established. As Holstein (1993) recommends, unified responsibility for the legal cadastre would be highly desirable.

Internally, the Tax Inspectorate will need to assign responsibility for compiling the register of taxpayers, valuation, tax billing and collection, and compiling the fiscal cadastre. Working groups will need to be formed.

Consideration should be given to establishing a valuation office separate from the tax administration in the future. This office would be responsible for all governmental valuations, including those needed for tax administration.

E. IMPLEMENTATION PLAN

I recommend a three phase implementation plan, consisting of: (1) an initial phase, (2) a transitional or developmental phase, and (3) a mature operational phase.

1. Initial Phase

The initial phase which would encompass the work that must be done by the Tax Inspectorate to (a) implement the property tax system envisaged in the current draft legislation and (b) prepare for the transitional phase. An early priority would be to

prepare a detailed plan for accomplishing this work. Among the matters to be considered include:

- Legislative Framework : Legislation lays out policy choices, provides the environ ment for their achieve ment, and assigns responsibili ties. Work modifying or elaborating existing legis lation should begin early in phase 1.

- Resources : It will be necessary to obtain funding, make organizational changes, develop staff, consider the feasi - bility of computerization, and acquire facili ties and equip - ment. Arrangements for technical assistance should be made.

- Systems and Procedures : A major devel opmen tal activity will be the design of systems and procedures. This work involves identifying needs, evaluating alternative solutions, and choosing the best solution in the circumstances. The fol - lowing is a checklist of the major matters to be resolved:

  - Systems and procedures for registering objects and subjects

  - Public information needs

  - Acquiring agricultural cadastral data and in formation from inventory offices

  - Acquiring other lists of taxpayers

  - Devising basic billing and collection strategy and proce dures

  - Ensuring system security

- Training : Extensive training will be needed. Courses offered by the Organisation for Economic Co-opera tion and Development would provide a good introduc tion. Later, specif ic train ing in Armenian systems and procedures will need to be developed and offered.

- Data Collection : In phase 1, data collection would focus on the regis tration of subjects and objects. In addi tion, the tax adminis tration should begin collecting market data.

- Valuation : Valuation generally would be restrict ed to applying starting prices to data received in returns. Howev er, valuation research should be contin ued.

- Collection : Phase 1 collection procedures would be imple - mented.

- Appeal : An initial appeal procedure should be devel oped.

- Quality Assurance : A quality assurance program will need to be developed.

- Public Information : A public information pro gram, designed to secure voluntary compliance with the new taxes, should be implemented.

- Planning for Phase 2 : It will be necessary in phase 1 to lay the ground work for phase 2, the creation of a workable fiscal cadastre. This work would include:

    - Determining the feasibility of computerization

    - Acquiring work maps, developing the ca dastral numbering system, and developing cadastral record forms

2. Transitional Phase

The second or "transitional phase" would span the creation of a first-generation fiscal cadastre. Its chief goal would be to broaden coverage of the taxes. The creation of the cadastre would ensure that more taxable objects were discovered. At the same time, collection and, to the extent that market condi tions permit, valuation procedures would be refined. Phase 2 would require establishment of institu tions capable of maintaining the fiscal cadastre and carrying out an ongoing valuation program. It should begin in the second year of the proposed taxes on land and property. The phase 1 property tax system would continue in operation.

3. Mature Phase

The third or "mature" phase would begin with the completion of a fiscal cadas tre. It would be an ongoing opera tional phase.

I. BACKGROUND

This is a report of a second short-term technical assistance mission to the Republic of Armenia by Richard Almy, a partner in Almy, Gloudemans & Jacobs, a US-based consulting firm specializing in property taxation. The mission took place 1-12 November 1993. It followed an earlier mission in July and August (see Richard R. Almy, "Cadastral Records, Property Taxation, and the Privatization of Property in the Republic of Armenia," October 1993, afterwards referred to as "Almy 1993a"). Almy was joined by Lynn C. Holstein, a specialist in cadastral systems. The purpose of their mission was to assist Armenia develop legal and fiscal cadastres and to introduce recurrent taxes on land, buildings, and other property. (Also see: Lynn C. Holstein, "Aspects of the Legal Cadastre in Armenia," December 1993, afterwards referred to as "Holstein 1993.")

This report also surveys progress made between August and November 1993 in two areas: property tax legislation and market monitoring activities.

Independently and in conjunction with Holstein, the author met with numerous Armenian officials and experts. See annex 1. The mission culminated in a wrap-up session attended by about fourteen (see Almy 1993b).

This report attempts to lay out in more detail matters that will have to be resolved during the introduction of property taxes and the creation of a fiscal cadastre.

II. POLICY AND LEGISLATIVE MATTERS

The Parliament of the Republic of Armenia was anticipated to have adopted the proposed land and property taxes in 1993 but neither law had been approved by Parliament by January 1994. The draft of the law on property tax being considered by Parlia ment was thought not to differ significantly from the draft I reviewed in August (see Almy 1993a). A new English translation of the draft law on land tax was sent to me in September. This chapter addresses this draft and other policy and legislative matters.

A. REVIEW OF DRAFT LEGISLATION

Although brief, the English versions of the draft laws on land and property taxes lay out a complex, difficult to adminis - ter property tax system. Armenia should further review the drafts and make sure the problematic points discussed below are addressed. One objective of the review would be to facili tate implementation of the property tax system envisaged by the Tax Inspectorate Office (see chapter IV). Legislative intent is not always clear. Another objective would be to harmonize the two tax laws to simplify administration and to avoid policy con - flicts. It would be desirable to draft a unified law on the taxation of property. As some land can now be pri vately owned, it may be desir able to embrace conventional western definitions of "property."

In the west, property conventionally is classified as "immovable" or "movable." Immovable property includes land, buildings, and other improvements to land. Movable property includes industrial plant and equipment, aircraft, watercraft, and the like. Although it is possible to value and tax land and buildings separately, they usually will be transferred from one owner to another as a unit. Actual market prices will reflect the combined value of the land and buildings. Consequently, an allocation of value between land and buildings will be somewhat arbitrary.

Based on the drafts I r eviewed, the following topics are among those that should be re viewed: status dates, the basis of values, and payment dates. Except for changes in holdings, privileges, and the like, 1 January implicitly is the date for determining taxable status under the property tax law. The land tax law (article 18) explicitly estab lishes 1 July as the status date. A single status (valuation) date should be established.

The basis of cadastral values is not clearly defined in either law. I recommend current market value as of the status date. Annual rental value, which is the legal basis for agricultural land tax assessments, is another option. The choice would depend on whether most land and buildings will be occupied by owners or tenants. The privatization of agricultural land and urban housing would suggest that ownership will be the primary form of land tenure.

A market value standard would require estimates to be made of most economic legal (or "highest and best") use of assessable properties. Greater emphasis would be placed on current use under a rental value standard. Unoccupied property commonly is not taxed under annual rental value systems, making it easier for owners to hold property in excess of current needs.

The law should identify the property rights to be valued. (See Holstein 1993.) It is ordinarily assumed in immovable property taxation that each taxpayer possesses the full set of rights that may be privately possessed.

Land tax payments are due on the 15th of November of the tax year and on the 15th of April of the next year. Property tax payments are due the 15th of September and the 15th of November. With the possible exception of agricultural property, land and property tax payment dates should be the same and harmonized with the status date.

With respect to the tax on property, there is some concern that the provision of article 4, which make each part owner of a building a taxpayer, coupled with article 2, which makes taxable only the value in excess of 850 times the minimum monthly salary, will result in a multiplicity of part ownerships of apartments, most of which would escape taxation. The intent of this provision should be clarified.

B. POLICY RESEARCH

Careful analyses of the fiscal and economic effects of the proposed complex differential taxation structure would be desirable. The goals of the analyses would be to ensure that the land and property taxes reinforce the Republic of Armenia's broader policy objectives and that fiscal objectives are met. The researchers should be alert to perverse incentives, such as the part-owner incentive mentioned above.

It may be desirable to formalize revenue targets. As an example, an overall target for taxes on property might be set at

2 percent of GDP or 3 percent of person al income. Effective tax rate benchmarks, such as no more than 1 or 2 percent of market value, also might be established. Admin istrative expenditure targets also could be estab lished. These could be used to justify proposed administrative expenditures.

III. MARKET MONITORING

A. OVERVIEW

In September 1993, the Armenian Urban Research Institute (AURI) resumed monitoring real estate market activities in the City of Yerevan. The research is described in "Housing and Land Market in the City of Yerevan: Monitoring, September 1993" (Mushegian and Sogomonian 1993). This chapter reports on their research.

The AURI market monitoring program appears sound, although some improvements could be made. The research will produce several benefits. The researchers will gain valuable experience. More important, the research can provide the basis for simple mass valuation models for estimating the value of residential land, houses, and apartments. The Tax Inspectorate Office could use such models in implementing the property tax.

The research will continue for several months, and the researchers plan additional analyses. They plan to track sales from initial agreement between the buyer and seller through registration of the change in ownership, a process that takes about two months. This will enable them to obtain more information about the properties that are sold. They also will obtain information on the degree to which prices are understated in registration. They plan to plot sales on maps, which will enable additional spatial analyses.

The AURI is using database software to record the market data. This will permit additional computer-assisted analyses of the data. Having the data in computer-readable form also makes possible multivariate analyses using statistical software (see section D).

I also recommend that the feasibility of doing similar research outside Yerevan be explored. The Tax Inspectorate could benefit from information about housing values in other cities and villages and about the value of dachas.

B. DATA COLLECTION AND PROCESSING

The AURI is monitoring the immovable property market in Yerevan in three ways. First, the researchers are collecting information on listings, which they regard as a measure of supply. Second, they are collecting information on prices, which they term "the market price of demand," from a variety of market

sources. Finally, they are collecting informa tion on transac - tions registered in the Yerevan inventory office. Sources of listings include print and television media and brokers. (For some reason, immovable property brokers are called "stock ex - changes" or simply "exchanges.") Sources of price data include a few brokers, who supply information confi dentially, and the "illegal" market, which comprises unregistered dealers and individual sellers. Members of the monitoring team enter this market by posing as buyers, negoti ate a deal, and then back out of it. They regard the prices agreed to as reasonable surrogates for actual market prices.

The AURI reported 1,652 observations in September and 1,521 in October. Of the September observations, 671 were ownership changes registered with the Yerevan building inventory office (these were not entered into the database provided to ICMA). The researchers regarded only one of those as dis closing a plausible price.

I was able to examine 970 records of the remaining 981 September observations. The majority of the observa tions were listings. Only forty-two September observa tions contained price information. Nineteen October observations contained price information. Most of the observa tions were of apartments. There were no land transactions.

Annex 4 describes the information contained in AURI's market data spreadsheet. I regard all of the characteristic data as potentially valuable in valuation. The data in AURI's database would be particularly valuable in market and income models (which are discussed in section IV.A). A few refine ments are recom - mended in annex 4. Additional structur al details would be desirable were reliance to be placed on cost models (greater structural data requirements is a disad vantage of cost models). Additional data will be needed in land valuation. The geographic coordinates of a point representing each parcel would be very desirable (such as the approximate centroid of the parcel).

As general recommendations, data quality should be stressed over data quantity and the research should concentrate on sales rather than listings. Each sale should identified by an address (or cadastral number). Consideration should be given to collect - ing additional data elements.

Consideration should be given to reducing the amount of data compiled on each listing to, perhaps, district or zone, size, and asking price. It may be useful to continue to report data on the number of listings.

Ideally, each sale would be checked in the field to ensure that the data on its characteristics are accurate. Properties with unusual physical characteristics and with unusual prices should receive greatest attention. These properties may represent "outliers," which should not be included in the data sets used to develop mass valuation models.

I also would recommend a test program of contacting the seller, buyer, or both after registration to confirm sales information. There is a need to evaluate whether a sale is an "arm's-length, open-market" transaction that is representative of the housing and land market in Yerevan. Third parties, such as brokers or lenders, also might be contacted. Such contacts will be especially important when commercial and industrial properties begin to be sold.

C. ANALYSIS AND PRESENTATION OF DATA

At the time of my mission, the AURI had supplied the ICMA office in Yerevan with paper copies of its market data spreadsheets for September and October. The September data were accompanied by the above mentioned report (Mushegian and Sogomonian 1993b). The October data were accompanied by two computer-generated summary tables. The AURI intends to produce quarterly narrative reports.

The written report for September and the October tables present tabulations by zone, number of rooms, and type of unit (flat or single-family house). Both reports present data on average asking prices per square meter. (The October ruble prices were converted to dollars based on an exchange rate of 2,500 rubles per dollar.) The September report contains additional analyses, including rates of change from July 1993, although the presentation of those data was not entirely clear.

D. PLANS FOR VALUATION MODELING

The AURI researchers want to apply multivariate analyses to develop valuation models, such as Joseph Eckert did for sets of Krakow and Moscow data (which are perhaps best described in Eckert and Kalinina 1993; also see Eckert 1992). The chief goal of Eckert's research was to evaluate how well immovable property markets were functioning in the two cities. A second goal was to demonstrate technology widely used in mass valuation in western countries.

I have done similar exploratory modeling using the data described above and in annex 4. As the numbers of observations and proper ty characteristics were smaller and as the geographic coordinates of each property were not available, it is premature to make strong claims regarding the usefulness of the technology in Armenia. However, in the representative model described in annex 5, the variable coeffi cients had expected signs, suggesting a "rational" market. In addition, the model tends to validate AURI's land value research. An optimistic conclusion would be that regression analysis of spatial and other property character - istic data could produce defensible mass valuation models. For this reason I recommend the valuation pilot studies discussed in section IV.A.3.a.

One question that should be asked is whether early sales in a market truly reflect the supply and demand for housing in Yerevan or whether they represent a market niche. If the AURI's exchange rate of 2,500 rubles to the dollar is reasonably accu - rate, there is some evidence that the dollar sales reflect one market and the ruble sales another. The median price of dollar sales was $8,000, which is about 160 times the minimum annual salary and about 30 times a professional salary. In contrast, the median ruble price converted to dollars was $1,900, which is about 40 times the minimum salary and six times a professional salary. It seems unlike ly that ordinary families could purchase housing at dollar prices. In other words, the observed prices may not represent typical housing values. Annex 5 illustrates the consequences of using an inappropriate valuation model.

IV. IMPLEMENTING A PROPERTY TAX SYSTEM

Armenia's property tax system must be able to identify taxable subjects (taxpayers) and taxable objects and link them. Objects must be valued and assessed correctly. Tax assessments must be collected. If any of these is done poorly, tax equity will suffer. Revenue generation also may suffer. In addition, Armenia's proposed property tax system envis ages differential taxation based on the characteristics of subjects and objects. The system must collect sufficient informa tion to classify both properly.

Current economic realities dictate that the Republic of Armenia instal l a property tax system in a very short time, with available resources, and with available data. Compro mises in all three of the above areas will be necessary initially. Fiscal needs require that the property tax system must be in place before a comprehensive fiscal cadastre can be completed. Conse - quently, the initial focus should be on identifying the most valuable objects of taxation and the sub jects whose property is sufficiently valuable to generate tax revenue in excess of administra tive costs. Mass valuation models should be simple-- requiring only data that are readily available. Public informa - tion pro grams, billing, and enforcement should be vigorous so that taxpayers realize that the new taxes are "real." Also, tax obligations should be affordable, an issue outside the scope of my investi gation (but see section III.D).

However, work to correct initial property tax system defi - ciencies should be a part of initial system development plans. Otherwise, tax inequities will grow, producing both revenue shortfalls and public opposition.

This chapter focuses on the administration of the land and property taxes (policy and legislation are the subject of chapter II). Section A considers options for identifying taxable sub - jects and objects, valuation, tax billing and collection, and related record systems. Section B addresses organization. Section C addresses the timetable.

A. PRINCIPLES, DESIGN DECISIONS, AND CONSENSUS RECOMMENDATIONS

The proposed laws on land and proper ty taxes specify parts of the Armenian property tax system. Other characteristics can be inferred from the laws. The principles of equity and effi - ciency suggest others. A few gaps and ambiguities will need to be resolved.

1. Identifying Taxable Subjects and Objects

Armenia's property tax system must be able to identify taxable subjects (taxpayers) and taxable objects (linking subjects with objects is discussed in section 2, below). Subjects and objects also must be classified. If all or part of tax receipts are to be distributed to local governments, it may be necessary to determine "situs" or the jurisdiction entitled to receive the tax revenue from a particular object or subject.

The proposed laws on land and property taxes imply a complex classification system. Taxable subjects fall into two major classes: users (of state land) and owners. Distinctions also are made between physical persons and legal persons (enterprises, organizations, and institutions). The classification of objects is more complex. Land has five classes: (1) agricultural (article 4), (2) land allotted for gardening (dachas plots) (article 5), (3) privatized (urban?) land (article 6), (4) industrial land (article 7), and (5) forest land (article 8). "Property" (buildings and certain movable property) is classified according to its ownership and use: (1) property owned by enterprises, (2) property owned and used by physical persons, and (3) property owned by physical persons but used by enterprises.

Physical persons are assigned a person number, and the *propiska* (domestic passport) system identifies their legal place of residence. State enterprises presumably are well identified. However, not all persons live in their legal place of residence, and not all private enterprises are registered.

The identification of objects is less complete. Most agricultural land parcels have been identified in the agricultural land cadastre. As it is state owned, urban land largely has not been divided into parcels. Consequently few urban land parcels have been identified, although construction project plans (archived by city architects) are said to identify the land associated with a particular project. So-called "illegal" construction and encroachments may not be identified in official records. Most apartment buildings are identified by a building "passport." Presumably construction project plans identify many other buildings. Also, aircraft, watercraft, and many motor vehicles presumably are licensed. Other taxable immovable and

movable property will have to be identified by their owners or the Tax Inspectorate.

An noted in Almy 1993a, the identification and classification of property owned by physical persons but used by enterprises is anticipated to be difficult. Other difficulties with classification can be anticipated, such as with some exemptions.

The law requires the tax administration to assess the land of physical persons and peasant farms and issue tax bills. (Wunderlich [1993] reports that there are 238,000 peasant farms.) Enterprises are to assess their own property and make tax payments.

As noted in section II.A, a further complication is that each part owner of property is to be sent a separate tax bill. This implies that individual apartments, and conceivably parts of apartments, will have to be identified. In addition, a method of prorating assessments will be needed.

2. Taxpayer Registers

Taxable subjects and objects must be linked and this information must be organized by the Tax Inspectorate. There are two broad approaches to this: (1) registering property as declared by owners and (2) building a fiscal cadastre. Of course, a property tax system can contain elements of both approaches.

The earliest property tax systems relied upon taxpayers to visit tax administrators and declare their property holdings and tax liabilities. Tax administrators, in turn, would compile a list of taxpayers, the amount of property each taxpayer declared, and the amounts of taxes paid. In early agrarian societies, such an approach was satisfactory. Tax collectors personally could verify that each taxpayer's declaration was reasonably accurate and that a fair amount of taxes was paid. Administrative burdens were low. As economies became more complex and as populations grew, the shortcomings of relying on taxpayers to assess their own taxes became apparent. Some taxpayers failed to declare any property. More taxpayers would under-report or under-value their property. Opportunities for favoritism and corruption grew. In short, tax administrators could no longer rely on their general familiarity with property ownership and value in their communities to achieve equity and to collect sufficient revenue.

Nonetheless, a person-oriented property tax system offers a feasible initial, but temporary, solution in a country like Armenia, where cadastral records are not complete and open property

markets are not well established. Recognizing this, the Tax Inspectorate Office quite reasonably plans a person-oriented tax system.

The Tax Inspectorate envisages obtaining information about property owners and users and their property holdings from all available sources, including owners and users themselves, inventory offices, Giprozem (the agency of the Ministry of Agriculture responsible for the agricultural cadastre), and other offices. (Article 4 of the draft property tax law appears to require the cooperation of registration agencies, but the draft land tax law appears not to have a parallel provision.) The Inspectorate would assemble the information in its computer system, value property, calculate taxes, and send statements to taxpayers.

Records would be organized by personal identification number. Another key should be address, and provision should be made for recording a cadastral number.

The Tax Inspectorate will need to design tax returns and draft instructions. Enterprise tax returns will be required, as article 4 of the draft property tax law and article 16 of the draft land tax law require enterprises to assess their own taxes (although article 2 of the land tax law contradictorily states that the object of the land tax is the cadastral value of land). Although the Tax Inspectorate may prefer to rely on registers and documents received from other agencies to assess physical persons, I believe a physical person return will be needed as well. Initially, those other agencies may not have records in a form that would be convenient to the Tax Inspectorate. For a variety of other reasons, they may not satisfy the needs of the Tax Inspectorate. For example, they may not be able to transmit records in a timely fashion. As noted above, not all taxable subjects and objects will be identified in official records. It would be unwise to allow a subject to avoid the obligation of paying taxes merely because of a failure or lack of capacity on the part of some government agency.

An effective public information program will be needed to tell potential taxpayers about the purpose of the new taxes and about taxpayers' obligations. A system for distributing blank returns will need to be devised. (The Czech Republic required taxpayers to pick up blank returns in banks, post offices, and tax offices.) An alternative would be to mail blank returns.

Procedures for receiving and processing returns will need to be developed. These include recording the receipt of returns, reviewing them for completeness and accuracy, making necessary

revisions, and calculating assessments and taxes due. Returns should be matched manually or by computer with lists of enterprises, privatized apartments, peasant farms, and the like. Mismatches would need to be investigated.

Problems can be anticipated with incomplete returns and errors. Variations in the spelling of names and errors in inscribing identification numbers can be problematic in any system. If available, bar coding technology should be used to speed processing of returns and tax payments.

The person-based system would remain in operation until a transition to a fiscal cadastre-based system can be made.

3. Fiscal Cadastres

A fiscal cadastre consists of (1) a set of large-scale maps depicting parcel boundaries; (2) a cadastral numbering system, by which each parcel is assigned a unique number; (3) records describing the land parcels and any buildings situated on those parcels; and (4) records of the persons responsible for paying property taxes. An important fifth component in a value-based property tax is a separate sales file, in which information on sales prices and terms is recorded, along with descriptions of properties as of the date of sale.

The Tax Inspectorate may not fully appreciate the value of a fiscal cadastre. The superiority of fiscal cadastres over ownership registers was recognized in Europe in the 18th century. Only by creating a fiscal cadastre, which organizes land and building records geographically, can the tax administration ensure that all assessable objects are discovered and correctly described. Having information on spatial characteristics also facilitates valuation, particularly of land. Several articles of the draft land tax law (including articles 2, 3, 15, and 18) would appear to require a fiscal cadastre. (The Czech Republic's experience in 1993 with the first year of an automated person-register system also confirms the ultimate need for a fiscal cadastre.)

As previously noted, the information needed to build a fiscal cadastre does not currently exist in Armenia. Urban parcels have not been delineated. Consequently, there can be no complete set of cadastral maps or cadastral numbers. Buildings are not linked with specific parcels, and official records may not contain information on some buildings. The question is: what strategy should be followed to convert from the planned person-based property tax system to a cadastre-based system? A

key issue is the relationship between the fiscal cadastre and the legal cadastre.

In principle, legal and fiscal cadastres can be (1) tota lly independent, (2) linked, or (3) fully integrated. Independence avoids need for institutional coordination, but results in duplication of effort and ambiguities and redundancies in data. Full integration is most appealing theoretically but seldom is practical from a managerial and financial standpoint. Conse - quently, linked legal and fiscal cadastres generally are recom - mended. The common elements would be the cadastral maps and the cadastral numbering system. As the legal cadastre is compiled (see Holstein 1993), data would flow from it to the fiscal cadastre to refine the data in the latter.

By neces sity, an Armenian fiscal cadastre initially must be rudimen tary and incomplete. It must precede completion of the legal cadas tre. Happily, Holstein 1993 reports that the Insti - tute of Cartography and Geodesy Institute of Cartography and Geodesy has produced base maps at scales of 1:2,000 and 1:500 in urban areas for the gas company. Such maps would make an appro - priate base for the fiscal cadastre. Almy 1993a (pages 41-43) outlines a method for provisionally delineating parcel bound - aries.

Article 3 of the draft law on land tax, which calls for per-unit-area tax rates, will require an estimate of each parcel's area. (Otherwise, a standard price could be assigned standard-sized parcels, a simple valuation approach.) Perhaps the sim - plest method of calculating parcel area would be to use trans - parent grids to count units of areas (my impression is that this approach is used in the agricultural cadastre).

As a cadastral number ing system common to the legal and fiscal cadastres would reduce ambiguity, a means of deciding such a system needs to be found. A working group composed of repre - sentatives of the Tax Inspectorate, mapping and cadastral agen - cies, and inventory offices might be formed to propose such a system to the government. Of course, both cadastres could maintain parallel numbering systems. If a consensus numbering system cannot be found soon, the Tax Inspectorate could assign provi sional numbers to avoid delays in setting up the fiscal cadastre. (Annex 6 con tains my recommendations for a cadastral numbering system.)

Almy 1993a contained a general discussion of land and build - ing record requirements and of sales and other market data requirements.

In conclusion, a general principle should be to design a functional, affordable fiscal cadastre, even though it may not reflect the state of the art technologically. A fiscal cadastre is a tool to be used. Use implies having the means and willingness to maintain it. Of course, the eventual use of computer technology--digital maps and geographic information systems--should be kept in mind.

4. Valuation Process

The introduction of the proposed taxes on land and property will require the development of a capability to value all types of taxable property. This section describes and evaluates the methodological and administrative options for developing a valuation program. (Valuation treatises describe methodological options in considerably more detail.)

Problems that must be overcome include (a) property markets in their early stages of development, (b) a corresponding shortage of market data, and (c) few experienced immovable property valuers. The resources that can be allocated to property tax administration are limited. These conditions constrain initial options, as is widely recog nized. However, the design of the valuation program should not be unduly constrained by current conditions, as they can be expected to improve. On the other hand, it would be a mistake to believe valuation will become easy; for some types of property, valuation always will be difficult.

Valuation is both a science and an art. As mentioned in Almy 1993, valuers consider three main types of evidence: sales prices, incomes generated from rent, and construction costs. Valuation treatises and standards organize valuation activities in a "valuation process."

In conventional single-property valuation, the valuation process has seven main steps which the valuer follows with each new valuation assignment: (1) define the valuation problem; (2) make a preliminary analysis, plan how to solve the problem, and select and collect the necessary data; (3) determine the most economic legal use; (4) estimate land value if required by the assign ment; (5) estimate total property value; (6) reconcile value indicators and reach a conclusion as to val ue; and (7) report the conclusion.

These activities are present in the mass valuation procedures used in property tax administration, although the work must

be highly systematized to achieve necessary economies. The valuation problem is defined in legislation. Most of the neces - sary data reside in the fiscal cadastre. Valuation is accomplis - hed through the development and application of formal valuation models. Valuers employ quality assurance procedures to ensure data accuracy, evaluate the valuation models, and review value estimates. Taxation requires that a value estimate be officially adopted for each property, and the estimate (the assessment) should be communicated to the taxpayer on an assess ment notice or tax bill. An inferior but economical alternative is to publish lists of valuations.

If computer assistance is possible, valuers can use statis - tical methods to analyze the effects of more supply and demand factors on prices than can be done using conventional valuation techniques. Consequently, mass valua tions can be highly accurate as well as economical.

5. Preliminary Analyses

a. Data Needs Analysis : As the most time-consuming and expensive aspect of a mass valua tion program is collecting and processing cadastral data, an important preliminary analysis process is to decide which data are needed. Cadastral records should contain the informa tion needed by the valuation model or models that will be used. The records should contain the loca - tion, site, and im provement characteristics that affect the attractive ness of a property in the marketplace.

b. Most Economic Legal Use : Good valuation practice requires a decision as to the most economic legal use of each property (the term used in U.S. valuation practice is "highest and best use"). In mass valuation, the current use generally is assumed to be the most economic legal use. One exception to this general rule is where development and redevelop ment are occur - ring, or are about to occur. Another exception is when a parcel is clearly over- or under-improved in comparison to its surround - ings. Informa tion on current u se also is necessary to assign land and buildings to their proper tax class. In addition to monitoring actual use, it is important to monitor changes in land use controls.

c. Sales Data Collection and Analysis : Monitoring sales is most important--even when available data may not be trustworthy. Ideally, information on every sale would be col - lected, analyzed, and, if necessary, verified. Sales should be reviewed to determine which ones represent "open -mar ket, arm's - length" sales. Only those sales provide convinc ing evidence of

market value. The remaining sales should not be used directly in valuation. The following guide lines can be used to identify usable sales:

- The property should have been sufficiently exposed to the market to allow potential buyers enough time to make an offer (that is, related -party sales are not open -market, arm's-length sales).

- The buyer and seller should be knowledgeable and well -informed (neither party should possess knowledge of the potential use and value of the property not available to, or possessed by, the other).

- The buyer and seller should be under no compulsion to buy or sell.

- The price should not be affected by the terms of financing or other factors such as the inclusion of significant amounts of movable property (furniture, kitchen appliances, and so forth).

Theoretically, adjustments to a nominal sale price are warranted in a number of circumstances to reflect better the true price that was paid for immovable property. If movable property was included in the sale, the value of that property should be deducted from the total sale price. If the seller lent money to the buyer to complete the purchase, and if the rate of interest charged was different from the market rate of interest, the sale price should be adjusted for the present value of the difference. Such adjustments are more likely to be required for sales of business property.

Finally, it is sometimes necessary to adjust sales prices for differences between the dates of sale and the date of valuation. This occurs when price levels are changing significantly, such as when inflation is high. For this reason, valuers should analyze sale price trends.

As previously mentioned, the Tax Inspectorate should maintain a separate sales data file as part of the fiscal cadastre. This file should contain a record of each sale. The record should contain information about the sale price and terms, a description of the property that was sold (which is why sold properties should be field inspected), and an analyst's opinion as to the usefulness of the sale in valuation and in quality assurance studies. Sale validation codes should be developed. The codes indicate whether a sale has been determined to be

usable and, if not, why it was rejected. All sales should be included in the sales file.

d. Submarket Identification: An important preliminary analysis is to identify submarkets and "stratify" or assign each property to the submarket(s) to which it belongs. Examples of submarkets include the markets for vacant land and for housing. It also is necessary to analyze the effects of location attributes. Location analyses should consider market area, neighborhood, and site. A *market area* usually is an economic area or region--part of a large metropolitan area, an entire small city, or a cluster of rural communities. For some types of immovable property, such as large chemical factories, the market area can take on global proportions. A *neighborhood* is a homogeneous portion of a market area. Urban neighborhoods typically are areas where residents share similar socioeconomic characteristics. AURI has identified neighborhoods in Yerevan. *Site* refers to the unique location of a plot of land within a market area and neighborhood. Some sites are superior to others because of their specific location, size, shape, view, access to transport, and other features.

As properties are stratified, analysts should specify the units that will be used to analyze sales and other valuation data. Units of comparison for analyzing parcels of land include area measurements such as the square meter or hectare. Houses might be analyzed on the basis of area or another size indicator, such as number of rooms.

Valuers need to monitor land use and development trends and construction activity to gain information about changing demands and about current market participants' perceptions about the highest and best use of property. These activities also suggest cases where current market data might be obtained.

e. Other Market Data Collection Activities: Construction cost trends should be monitored. Rental property income and expense data should be collected, screened, and analyzed. Current information on rental property income and expenses is needed for the income capitalization approach to valuing property. It is desirable to require owners or managers of such property to file a return (which should be treated confidentially). Such a standardized reporting form facilitates reporting and analysis of income and operating expense data. Properties for which data are available should be grouped by type for analysis. Spreadsheet programs can be developed for entering

reported figures, adjust ing atypical figures, and estimating unreported figures.

f. Valuation Pilot Studies : Before firmly committing to a particular valuation approach, the valuation working group should test it in a pilot study. Such studies will enable the group to master the method and gain a first-hand appreciation of its useful ness in Armenia. In addi tion, the pilot studies would provide a basis for estimat ing shifts in tax burdens associated with any changes in valuation methods.

6. Valuation Options

Primary valuation options include: (a) market models, (b) income models, and (c) cost models. When the necessary market data are not available, the opinions of panels of experts and point differentiation tech niques can be substituted, such as AURI has shown. When the data permit, models of more than one type should be developed. Multi ple estimates of market value provide a consistency check.

a. Market Models : Valuers prefer market models when sufficient open -market, arm's -length sales are available. Simple models similar to the one described in annex 5 should be used in the beginning. The methods used to calibrate the models might begin with spread sheets and descrip tive statis tics. Multiple regres sion analysis (MRA) can be used when the volume of sales in a model group exceeds 30 or four sales for every independent variable in the model.

b. Income Models : Income models should be considered in the valua tion of rented properties. Separate models can be developed to estimate market rents, vacancy and expense ratios, income multi pliers (sale price divided by net income), and overall rates (net operating income divided by sale price). As with market models, the independent variables selected for the models should help explain variations in the dependent variables. Independent variables might include location, proper ty type, build ing condi tion, and (sometimes) land/building ratios. Many of the above analyses can be done on spreadsheets if the samples are small enough.

c. Cost Models : Cost models are used to estimate the value of buildings and other structures. Consequently, they must be used in conjunction with market or income models, which are used to estimate land values. Sometimes in mass valuation practice, a "hybrid" model is developed from a market model and a cost model. These are called "market calibrated cost models." A

cost model incorporates a method of estimating the current cost of constructing a building and a method of estimating *accrued depreciation* or diminished utility (physical deterioration, obsolescent features, and any adverse location or economic conditions). As can be seen, the use of cost models is a round-about way of estimating market value. However, cost models provide a back-up method when sufficient sales and income data are not available. Cost models generally require more detailed descriptions of the design of, and materials used in constructing, the buildings than are needed for market and income models. Cost models also require data on current costs of labor, materials, and other direct and indirect costs of construction. Statistical agencies and firms often compile data on building costs, eliminating the need for the property tax administration to do it.

In mass valuation, current building costs are expressed on a per-unit basis (for example, per-square-meter) and arranged in tables, which are compiled in a cost manual. Separate schedules are developed for each building type and construction quality class. Computerizing cost schedules speeds calculations and improves accuracy.

The success of cost models depends on reliable estimates of accrued depreciation and land values. In mass valuation, standard depreciation allowances are contained in tables or schedules. These depreciation allowances should be derived from market data.

7. Tax Collection and Enforcement

As stated in Almy 1993a (page 53), effective tax collection and enforcement are as important as discovering and valuing taxable objects. Property taxation without strict enforcement is not truly "taxation" but is a system for accepting contributions.

The five basic steps of an effective tax collection and enforcement program are:

(1) Tax liabilities should be assessed.

(2) Taxpayers should be notified of their tax liabilities.

(3) Taxpayers should be persuaded that they should pay.

(4) Tax payments should be received and properly recorded.

(5) Delinquent taxpayers should be forced to pay their liabili - ties.

Payment of taxes should be made as convenient as possible. Possible payment points in addition to tax offices include banks, post offices, and mortgage holders. Payments should be properly credited. The date a payment is received should be accurately recorded.

Under person-based tax registers, enforcement against delinquent taxes would have to be against the person, not the property. The administrative costs of enforcement against persons generally are higher than the costs of attaching a tax lien to a property.

8. Quality Assurance

Public acceptance of property taxation depends on the performance of every member of the property tax administration. The conditions necessary for effective performance include (a) establishment and documentation of standards of performance that conform to legal requirements and professional standards, (b) a well-organized and skilled staff, (c) ongoing evaluation of performance, and (d) effective programs to correct problems. These are important elements of a quality assurance program.

Public acceptance also will depend on a perception that the tax is fair. A perception of fairness is reinforced when data are accurate, valuations appear accurate and uniform, collection rates are high, and taxpay ers are treated without prejudice or favoritism. An organizational culture of public service and excellence helps ensure quality work.

The Tax Inspector ate should strive for the highest possi ble level of quality, by means of planning, continuous review, and correc tion as needed. Good management builds into every step a concern for quality.

9. Appeals

The accuracy and equity of assessments depend on well-informed taxpayers, who are given opportunities to "audit" the work of tax administrators. Armenia should begin to design an appeal procedure. Elements of the procedure include (a) estab - lishment of rights of appeal (and related legal matters), (b) creation of appeal bodies, (c) notice of assessment, and (d) proce dure for making appeals.

Initially, rights of appeal might be limited to such things as corrections of measurements, classification, and eligibility for an exemption. Later, when valuation models are sufficiently sophisticated as to allow a different valuation of every property, valuations also should be subject to challenge.

It is often recommended that there be three stages to an appeal process: (1) informal appeal to the tax administration to correct errors and the like, (2) appeal to an independent local appeal body when the taxpayer and tax administration cannot reach agreement, and (3) appeal to the courts when a legal principle is involved.

Regarding notice, each property owner or taxpayer should be given a notice of every change in the assessment before the appeal period. (If mortgage companies pay property taxes, procedures should be established to ensure property owners receive assessment notices to protect their appeal rights.) Sometimes assessments are published or posted in lieu of mailing notices, placing an additional responsibility on taxpayers to look up their assessments after the assessment roll is made public.

The formality of appeal procedure will vary with the level of appeal. In general, appeals should be submitted in writing and decisions likewise should be in writing. Other matters, such as burdens of proof, rules of evidence, qualifications of witnesses, and the like should be specified in formal appeal situations.

B. ORGANIZATION PLAN

Successful introduction of land and property taxes in Armenia will require an appropriate institutional structure. At the outset, there may be a need to obtain the Government's and Parliament's understanding of the benefits and costs of property tax and cadastral system development. Their commitment will be essential to securing sufficient initial funding and in resolving differences between affected institutions. Responsibility for the legal cadastre is a matter that needs to be resolved (see Holstein 1993).

It also would be desirable to confirm responsibility for property tax administration. The draft laws on land and property taxes assign administration to the Tax Inspectorate. The AURI favors giving cities and the State Committee on Architecture and Urban Planning a role in the administration of land and property taxes, including updating starting prices.

I regard the Tax Inspectora te as an appropri ate initial choice. The office has experience with tax administration. However, land and proper ty taxes have features with which the office is not familiar. The office will need to develop its own internal organization and obtain help from other agencies and institu tions, including Giprozem, build ing inventory offices, the Institute of Cartography and Geodesy, and the AURI. The State Committee on Architecture and Urban Planning also may have a role. Consider ation should be given t o assign ing some responsi - bilities to local councils in the future.

Internally, the Tax Inspectorate will need to assign respon - sibility for compiling the register of taxpayers, valuation, tax billing and collection, and compiling the fiscal cadastre. Working groups will need to be formed. Operational branches should be decentralized for the convenience of taxpayers (inqui - ry, appeal, and payment of taxes), as I believe they are. Although valuation models would be developed centrally, it may be desirable to review application of the models locally. Decen - tralized functions should be adequately supervised.

It may be desirable in the future to establish a valuation office separate from the tax administration. This office would be responsible for all governmental valuations, including those needed for tax administration.

C. IMPLEMENTATION PLAN

The Government of Armenia soon will need to decide upon a general implementation strategy for setting up the property tax administration and fiscal cadastre. Considering current circum - stances and long-term needs, I recommend three broad phases: (1) an initial phase, (2) a transitional or developmental phase, and (3) a mature operational phase.

1. General

Each phase will have common tasks, such as estimating work loads, production rates, and available and needed resources. A major task will be scheduling--dividing the overall project or process into smaller tasks and activities, noting depen dencies, and graphing for clarity. It would be helpful to employ project management software.

As noted in Almy 1993a, planning should address the follow - ing:

- Establishing Legislation
- Marshalling Resources
- Designing Systems and Procedures
- Training
- Data Collection
- Valuation
- Public Information
- Ongoing Administration

2. Initial Phase

The initial phase which would encompass the work that must be done by the Tax In spectorate Of fice to (a) implement the property tax system envis aged in the current draft legislation and (b) prepare for the transitional phase. A plan for complet ing the transitional phase also should be made in 1994.

a. Establishing Legislation : The legal framework, or body of laws and regulations that govern a tax, lays out policy choices, provides the environment for their achieve ment, and assigns responsibili ties. Work modifying or elaborating existing legislation should begin early in phase 1 (see chapter II, section A). This work would include finalizing and adopting regula tions regard ing starting prices for s tandard housing units and land parcels. See AURI 1993b. The starting price concept may need to be expanded to other types of property. Related activi ties would include finalizing and adopting interim proce dure for selling land. See AURI 1993a. This would be dependent on the starting price regulation. The land auction AURI has mentioned as a prior ity project may be dependent on both.

It also would be desirable to create the legal structure discussed in annex 3.

b. Marshalling Resources : It will be necessary to obtain funding, make organizational changes, develop staff, and acquire facilities and equipment.

Regarding funding, it may be necessary to develop and secure approval of project and operational budgets providing for regular and temporary employees, office facilities and equipment, any

computer systems, transport, forms, and so forth. Appropri ate sources of funding should be identified (e.g., from govern ment budgets, proceeds from privatization, sales of products and services, grants). Arrangements for technical assistance should be made.

It will be necessary to finalize institutional arrangements. Among the functions to consider are title registration, cadastral mapping, development and maintenance of a fiscal cadastre, valuation, tax billing and collec tion. Working groups will need to be formed, and any advisory committees will need to be formed.

It will be necessary to determine the feasibility of comput - erization. Environmental conditions and the availability of equipment service personnel should be considered along with technical feasibility.

Equipment and other needs will include map storage equip - ment, measuring instruments, and training and reference materi - als.

c. Designing Systems and Procedures : A major devel - opmental activity will be the design of systems and procedures. This work involves identifying needs, evaluating alternative solutions, and choosing the best solution in the circumstances. The best solution often will not be the most technically sophis - ticated. In addition to design activities, manuals and forms must be prepared. Following is a check list of matters to consider:

- Procedures for registering objects and subjects, including
  - taxpayer returns and instructions
  - return distribution strategy--pick up or mail?
  - return processing procedures
- Public information program
  - rationale for new taxes
  - taxpayers' rights and responsibilities
  - how to obtain returns, instructions for completing them, sources of required information, and deadline for filing

- Acquiring agricultural cadastral data
- Acquiring information from inventory offices on privately owned property
- Acquiring other lists of taxpayers
- Devise basic billing and collection strategy and procedures
    - distribution of bills
    - payment points--only tax offices?
    - accounting for receipts
    - delinquent tax enforcement procedures
- Security procedures
    - returns
    - payments
    - equipment
    - disaster recovery

Technical assistance may be desirable.

d. Training: Training needs will range from introductory courses on property taxation such as are offered by the Organisation for Economic Cooperation and Development to specific training in Armenian procedures.

Procedural training materials and programs will need to be developed. Subjects to be covered include: basic administration, registration of subjects and objects, valuation, and tax administration. Needs will evolve as progress is made.

e. Data Collection: In phase 1, data collection largely would be restricted to the activities associated with the registration of subjects and objects discussed above. In addition, the tax administration should begin collecting market data.

f. Valuation: Valuation generally would be restricted to applying starting prices to data received in returns. However, AURI's price estimation program should be continued.

g. Collection : In phase 1, the collection procedures mentioned above would be implemented.

h. Appeal : An initial appeal procedure should be developed.

i. Quality Assurance : The components of a quality assurance program include:

- Staff selection and training
- Professional ethics
- Organization
- Computer system design
- Assessment standards
- Data edits
- Security procedures
- Ratio studies
- Appraisal reviews
- Procedural audits
- Effective internal communications
- Corrective actions
- Taxpayer feedback through objections and appeals

j. Public Information : The public information program should be implemented. Its goal would be to encourage voluntary compliance with the new taxes.

k. Planning for Phase 2 : It will be necessary in phase 1 to lay the ground work for phase 2, the creation of a workable fiscal cadastre. Phase 1 activities could include:

- Determining the feasibility of computerization
- Acquiring work maps

- Developing the cadastral numbering system (in conjunction with the institution(s) involved in creating a legal cadas - tre)

- Developing cadastral record forms

3. Transitional Phase

A first-generation fiscal cadastre would be created during phase 2, the transitional phase. Its goals would be to broaden coverage of the taxes and, to the extent that market conditions permit, refine valuation procedures. The phase 1 property tax system would continue in operation, perhaps with refinements designed to improve equity and efficien cy and to smooth the transition to a cadastre-based system with more realistic valua - tions. Major activities would be to delineate parcels on work maps. Next, a unique cadastral number would be as signed to each parcel. That number would be used to link parcels, build ings, and interests in property. A field canvass would be required to complete the cadastre. Recent work by inventory offices and Giprozem should not be duplicated.

Phase 2 should begin in the second year of the proposed taxes on land and property. It would require establishment of institutions capable of maintaining the fiscal cadastre and carrying out an ongoing valuation program.

a. Development of the Fiscal Cadastre : It will be necessary to:

- Evaluate cadastral mapping requirements

- Initiate mapping program

- Build complete owner and user registers

- Evaluate valuation data requirements and define data ele - ments (continuing AURI research)

- Define new data files

- Prepare coding and valuation manuals and forms

- Convert or collect data

Data collection activities will evolve as the fiscal cadas - tre is developed. A field canvass will be necessary to ensure

that every building and assessable improvement is located on the correct parcel and is accurately described.

It will be necessary to develop and put into operation change-handling procedures designed to renew the cadastre as new privately owned parcels are created, as new buildings are con - structed, and buildings are demolished.

b. Development of the Valuation Program: The devel - opment of the valuation program will be an outgrowth of market monitoring. From observations of market data, better valuation methods will be developed. It will be necessary to specify valuation methods and prepare manuals, forms, and the like covering agricultural land, urban land, buildings, and other taxable property (business movable property).

4. Mature Phase

The "mature" phase would begin when the modern fiscal cadas - tre is complete. Each year in the mature phase, records created during the transitional phase would be updated as necessary. Re - cords on newly privatized land and property would be added. New information on market values would be analyzed. Additional informa tion needed for better valuations may be added. Re sponsi - bili ties may be reas signed.

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ANNEX 3. CREATING A LEGAL AND INSTITUTIONAL STRUCTURE FOR ACCURATE DISCLOSURE OF SALE PRICE DATA

The fact that declared prices do not represent real prices is widely recognized. Increasing the accuracy of declared prices of immovable property will require an appropriate legal and institutional framework and will take time. This section discusses some of the elements of such a structure.

Policy Issues. A central policy issue is whether information about the value of immovable property should be public or private. I believe there are strong reasons for making such information public. At the same time, I understand the sentiments of those who regard it as private.

There are two aspects of privacy: whether the disclosure of sales data conflicts with an individual's right to privacy and whether society should protect proprietary interests. With respect to an individual's right of privacy, it is human nature for individuals to want to control access to information about one's wealth. Sometimes one may want to brag about one's wealth; other times one wants to keep such information secret. The question is whether public interests override private interests.

The protection of proprietary interests is another matter. It does not take an immovable property broker long to discover that possession of information about properties that are for sale, about people who want to buy, and about sales prices is valuable in business. Having access to, and control over, such information places one in a competitive advantage. One also can sell such information to others after deals are completed. The question is whether one is entitled to ownership of sales price information merely because one gains access to it in the course of providing a service.

I think there are two reasons why the public's interests override private and proprietary interests. In addition, it is worth noting that immovable property sales data are available to the public in a number of countries and states. Neither citizens nor brokers seem to be injured.

First, markets cannot function efficiently when information about the properties that are for sale and about property values is not readily available. Buyers and sellers both benefit from lower transaction costs and from access to price information. Society benefits from a more efficient allocation of resources.

Second, government has a right to the information it needs to administer a tax effectively and efficiently. Of course, government may have to treat private information confidentially.

Of course, information that is public should not necessarily be free of charge. As the brokerage industry and the tax admin - istration realize, informa tion about the values of immovable properties is itself valu able. It is appropriate for government to recover its costs in providing information or in "adding value" to the information it possesses. It also is reasonable for government to purchase information from private sources such as brokers when the cost of doing so is less than the cost of compiling the information itself.

Another policy issue has to do whether and by what means government should attempt to recover the value of property that it has essentially given away during privatization. As discussed under "tax tools" below, taxation provides a possible recovery mechanism. How taxes are structured also affects how willingly taxpayers will disclose accurate market price information.

Tax Tools . There are at least three ways taxes can be employed to provide government with a share of the value, or the increase in value, of land and other immovable property. These are annual taxes on the market value of property (such as the proposed taxes on land and on "property"), transfer taxes (such as the existing notary fees), and the taxation of "capital gains" under the income tax. These taxes can be designed and used in conjunction with other tools to encourage accurate reporting of sale price data.

Broad-based, uniform taxes on immovable property at low rates (such as those proposed in Armenia) with revaluations based on mass valuation models provide little incentive for individuals to conceal prices from the tax administration. This is particu - larly true when the taxes are used to support local government programs that benefit property owners.

Transfer taxes are levied when land and property changes hands. The base of the tax is the value of the property. International experience teaches that high-rate transfer taxes designed to slow the accumulation of wealth--or to recover a part of the value of property given away through privatization--seldom succeed. High rates provide strong incen tives to conceal trans - fers and to conceal true prices. Armenia's experi ence with its 10 percent notary fee bears this out. High transfer taxes also tend to reduce the affordability of housing. International

experience also suggests that rates not be in excess of 1 to 2 percent.

The base of a capital gains tax is the *increase* in the value of a property while it is in its owner's hands. The gain is viewed as income and is taxed under an income tax. In capital gains taxation, the seller will want to understate the price to reduce her or his gain. In contrast, the buyer will want to exaggerate the price to provide a high "basis" for calculating a capital gain. (Making depreciation (amortization) of buildings and other property deductible from income taxation also encourages buyers to try to establish a high basis.) Consequently, offsetting interests provide an incentive for accurate disclosures of sale price information.

Regulatory Tools. Mortgage regulations are among the regulatory tools that can be used to encourage accurate declaration of sales prices. A rationale for government regulation of banks and lending institutions is the fact that depositors and shareholders individually cannot effectively oversee the performance of bank officials. When banks invest in immovable property mortgages, it is in the public's interest to ensure that they do so prudently. Regulations requiring that loan-to-value ratios be low enough to provide sufficient collateral in the case of default is one tool. When such limitations are in place, would-be buyers often have an interest in persuading the lending institution that the property they want to buy is valuable. In many instances, independent valuations of properties should be made before they are mortgaged. Mortgagees should be required to carry fire and casualty insurance. Mortgages should be registered. When the tax administration has legal access to this information, buyers have no incentive to understate the value of their property.

Another regulatory tool is licensing of professionals, such as accountants, brokers, notaries, and valuers. If professionals risk loosing their licenses for falsifying information, they usually will encourage their clients to be truthful.

As previously mentioned, official access to transaction documents, such as the contract of sale, any mortgage, any casualty insurance, any private appraisal is essential.

Parties to sales should be required to file an immovable property transfer return and attest to the completeness and accuracy of the information contained in it. The return should provide for disclosure of an accurate description of the property

transferred, the seller and the buyer, the price and terms of the sale, and other circumstances of the sale.

Institutional Structure . The law should require the owner - ship regis tration service (legal cadastre) to send copies of transfer returns and other information on property sales to the tax administration automati cally. Valuations made for different governmental purposes should be coordi nated (which is the chief rationale for governmental valuation offices).

Enforcement Tools . The law should provide appropriate penalties for failing to file returns or for filing false or incomplete re turns. Third parties such as attor neys, brokers, and notaries should be subject to sanc tions for filing false returns. Prominent, egregious falsifications should be the primary targets of en forcement actions. En force ment should be well publicized.

ANNEX 4. MARKET INFORMATION GATHERED BY A.U.R.I.

This annex describes the immovable property market information being collected by the Armenian Urban Research Institute (AURI) during its market monitoring program. The data on each individual observation are stored in a computerized database. See chapter III, section B.

1. Observation number .

2. Address . The information may include "neighborhood," street name, street number, and unit number.

   As noted in chapter III, the researchers hope to be able to follow the process from listing to sale to registration. They think the registration of September sales will be completed in November. As the researchers realize, tracking properties will require a specific address. I recommended that resources be concentrated on sales with specific addresses.

3. Zone . Earlier, the AURI delineated neighborhoods and assigned each neighborhood to one of five land value bands or zones. Zone 1 is the center. Zone 5 comprises the most distant, least valuable areas of the city.

   For the future, it would be desirable to enter a code for each neighborhood, so that it would be possible to monitor changes in neighborhoods, zones, and land value patterns.

4. Number of rooms . The room count excludes the kitchen, the bathroom, and any halls.

   As an indicator of size, the number of rooms can be an important variable in a market model. If regression analysis is used, it is important not to include more than one highly correlated size variable in a single model. The variable also might be important in an income model.

5. Gross and net living area . Living area in square meters is based on inside measurements. Gross living area includes the kitchen, the bathroom, and so forth. Net living area is the area of the rooms enumerated in column 4.

   As with number of rooms, gross or net living area can be an important variable in market and income models. Gross area of buildings (but not single apartment units) can be an important variable in cost models.

6. Floor and total number of floors . Some of the observations had the numbers transposed. The data should be reviewed and corrected. It would be possible to program data edits to identify possible errors.

   The floor on which an apartment unit is situated can be an important variable in a market model. An apartment on a higher floor would have a superior view and could command a premium for that reason. On the other hand, lower floors would be more desirable in buildings without elevators or reliable elevator service. Top floors and ground floors were said to be less desirable.

7. Building construction type and year . Three construction types were noted: (a) standard, (b) stone (the best), and (c) prefabricated panel (the worst).

   Building construction type can be an important variable in valuation. Year built is useful in constructing physical deterioration tables.

8. Quality or "conveniences" . Seven codes were noted, ranging from "+++H" (the best) to "H" (typical) to "---H" (the worst).

   For the future, consideration should be given to more detailed information on the factors that make immovable property attractive or unattractive in the marketplace. Possibilities would include variables describing physical condition of the building (or unit), whether the building (or unit) has been renovated, and whether the unit has a good or poor view.

9. Water system . Three types of water system were noted: (a) pump (the worst), (b) permanent water supply, and (c) gravity (with the last two types being best).

10. Open balcony area . In square meters.

    A balcony could be expected to make an apartment more attractive in the marketplace. Information on balcony area would be useful in estimating replacement cost.

11. Land area . If a single-family residence, associated land area in square meters.

    Land area is an important variable in land valuation.

12. Building area . If a single-family residence, building foot print in square meters. This should correspond to gross area in column 5.

    As noted above, building area is an important variable in valuation.

13. Price . Depending on the case, asking price and selling price, in dollars or rubles. As previously noted, there are few sales. Most sales are in dollars.

14. Source . Two sources were noted: (a) "market" and (b) "ex - pert." Most observations were from the market.

    For the future, more specific codes may be desirable. Do people use "for sale" signs? If so, inquiring of the occu - pant may represent another "source" of market information.

15. Asking price per square meter in rubles . Analysis of sell - ing prices is of much greater value.

16. Asking price per square meter in dollars . Analysis of sell - ing prices is of much greater value.

ANNEX 5. EXPLORATORY VALUATION MODELING

I used a statistical technique, multiple regression analysis and the data described in annex 4 to explore the feasibility of developing mass valuation models. The software used was SPSS for Windows. The initial analyses were confined to the forty-three observations with sales prices in dollars. Several models were specified and calibrated. An example follows.

The dependent variable was sale price in dollars. For the sample of forty-three, the mean sale price was $11,356, and the standard deviation of the sales prices was $9,434. (The sample contained an outlier with a $40,000 sale price.)

The candidate independent variables I chose, their means, and their standard deviations were as follows:

Variable	Mean	Standard Deviation
Number of rooms	2.6	1.2
Zone 2 (0,1)	0.186	0.394
Zone 3 (0,1)	0.186	0.394
Zone 4 (0,1)	0.163	0.374
Zone 5 (0,1)	0.302	0.465
Water type 2 (0,1)	0.302	0.465
Water type 3 (0,1)	0.140	0.351
Stone construction (0 ,1)	0.628	0.489
Prefab construction (0,1)	0.023	0.152
Poor quality (0,1)	0.093	0.294
Good quality (0,1)	0.349	0.482
Better quality (0,1)	0.047	0.213
Best quality (0,1)	0.047	0.213

Zone 1, water type 1, and average quality were used as reference variables. None of the sample were coded poorest quality or poorer quality.

Using stepwise regression produced the following model:

Sale price ($) = $11,237 (constant)
+ $4,030 * number of rooms
- $6,887 (if in zone 2)
- $12,130 (if in zone 3)
- $12,764 (if in zone 4)
- $15,755 (if in zone 5).

The independent variables had the expected signs, and the zone variables had the expected pattern (that is, apartment values

decline as zone numbers increase). The remaining vari ables were not included in the model because they did not meet the signifi - cance criteria ($T > 2.0$ to enter and $T < 0.1$ to remove).

The R^2 statistic for the model was 0.73, which compares favorably with the goodness-of-fit statistic reported by Eckert (1992). However, the standard error of the estimate was $5,226. In addition, it should be noted that I did not rigorously evalu - ate whether the model met the standard assumptions for linear regression models. Nor did I study the effects of removing outliers.

Although highly preliminary, I regard the results as promis - ing. They suggest that the market for apartments is behaving "rationally" (Eckert 1992). The results tend to confirm AURI's land value analysis.

If the model were applied without mo dification, the follow - ing values would be produced:

	Number of rooms				
Zone	1	2	3	4	5
1	$ 15,267	$ 19,297	$ 23,327	$ 27,357	$ 31,387
2	8,380	12,410	16,440	20,470	24,500
3	3,137	7,167	11,197	15,227	19,257
4	2,503	6,533	10,563	14,593	18,623
5	-488	3,542	7,572	11,602	15,631

Clearly, the model is unable to produce reasonable estimates of the value of one-room apartments in zone 5, but this example illustrates how a simple mass valuation model could be applied.

In good mass valuation practice, a model is applied to a "control group," a sample of sold properties that were not used to calibrate the model. To illustrate the concept and as a further test of the model, I applied it to the eigh teen proper - ties with prices in rubles. In the following table, the prices predicted by the model are compared to the reported prices converted to dollars using the rate of 2,500 rubles per dollar.

The table reveals anoth er problem: the model appears to overvalue properties in the control group. The "ratio" column contains the ratios of predicted values to reported values.

These ratios are analogous to sales ratios calculated in "sales ratio studies," a quality assurance tool used in the United States. Disregarding the cases with negative predicted values, the mean ratio is 2.451 and the median ratio is 2.214, suggesting that the model may overvalue property by more than a factor of 2. The "coefficient of dispersion," a statistic measuring valuation uniformity, is 32.5 percent. In general, coefficients greater than 20 percent signal unacceptably nonuniform valuations.

Reported Price	Predicted Price	Ratio
$ 880	$ 3,542	4.025
1,200	- 488	*****
1,200	- 488	*****
1,400	3,542	2.530
1,600	- 488	*****
1,600	3,542	2.214
1,600	3,542	2.214
1,800	3,542	1.968
1,800	- 488	*****
2,000	3,542	1.771
2,000	7,572	3.786
2,000	3,542	1.771
2,800	3,542	1.265
3,000	11,602	3.867
3,200	7,572	2.366
3,400	11,602	3.412
5,800	10,563	1.821
5,800	7,572	1.305

ANNEX 6. RECOMMENDED CADASTRAL NUMBERING SYSTEM

Components : For purposes of the fiscal cadastre, I recommend a map-based cadastral numbering system. That is, individual cadastral units (land parcels, buildings, or units of a building) would be located on large-scale cadastral maps, and each area (parcel) would have a unique number assigned to it. Associated records would contain the same cadastral number. I recommend that the cadas tral numbering system contain the following elements:

Local council code number --this code number would identify the local council entitled to receive the property taxes from the property in question. If the cadastral record system is computer ized, this code could, and probably should, be separate from the cadastral number. It would appear that a three-digit code would be sufficient.

Map number --each map in the cadastral map series (such as the 1:2000 series) should be assigned a unique number. A cadastral area number would be necessary, if cadastral administration were decentralized.

Block number --each map area should be divided into "blocks" which are logical groups of parcels. A block would comprise all the parcels bounded by four streets, for example. Each block in a map would have a number a numerical code assigned to it. Two digits normally would be sufficient for a block code.

Blocks (and parcels) that straddle map boundaries should be linked only to one map (usually the map containing the largest part of the block or parcel).

Parcel number --similar to the assignment of block codes, each ownership parcel in a block would have a code number assigned to it. Again, a two-digit code ordinarily would be sufficient.

Building number --because a parcel could have more than one building and because each building could have a different owner, provision also should be made for a building code. The code would not have to be assigned if all buildings are owned by the owner of the parcel. Two digits should be sufficient.

Unit number --similarly, a building could have multiple units, each with a different owner.

Change procedure : When the boundaries of an area are changed, either through combining or dividing existing areas, all affected areas should be assigned a new cadastral number.

Some parcels of land may straddle the boundaries of local councils or map areas. Rules for assigning cadastral numbers in such instances will need to be devised.